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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|-----------------------------|---------------------|------------------|
| 10/566,431 | 08/10/2006 | William Ted Masselink | 3367-101 | 5759 |
| 6449 7590 04/29/2009 ROTHWELL, FIGG, ERNST & MANBECK, P.C. 1425 K STREET, N.W. SUITE 800 WASHINGTON, DC 20005 | | | | |
| EXAMINER REAMES, MATTHEW L. | | | | |
| ART UNIT 2893 | | PAPER NUMBER | | |
| NOTIFICATION DATE 04/29/2009 | | DELIVERY MODE ELECTRONIC | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTO-PAT-Email@rfem.com

Office Action Summary

Application No.

10/566,431

Applicant(s)

MASSELINK ET AL.

Examiner

Matthew Reames

Art Unit

2893

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 January 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SE/US)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to because figure 4 does not show the appropriate band structure of the quantum dots. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 14-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- a. As to claim 14 and 23, it is unclear which direction is lateral one.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 14-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Holonyak (2003/0059998).

- a. As to claim 14, Holonyak teaches A quantum well structure for the absorption or emission of photons comprising a quantum well layer (see e.g. item 850) arranged between two barrier layers (see e.g. items 820, 825, 835, 865, 875, and 880), wherein at least one of the barrier layers (see e.g. items 825, 865) comprises nanostructures (see e.g. item 825, 865) which cancels or modulate a lateral homogeneity of the barrier layer (this is inherent to structure), which is present without the nanostructures (again this is inherent to the structure), characterized in that the quantum well layer (7; 107; 207; 301) is in the form of an absorption or emission layer for the absorption or emission of the photons (see e.g. fig. 8).

- b. As to claim 15, Holonyak teaches a well with different energy level (see e.g. fig. 9) therefor enabling different wavelengths to be absorbed or emitted.
- c. As to claim 16, Holonyak teaches InGaAs which is capable of self-organized behavior. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).
- d. As to claim 17, Honyak teaches InP quantum dots and InAlGaP barriers (see e.g. paragraph 42) InAlGaP inherently has a greater lattice constant than InP.

McGill (2004/0099872) teaches InP has a greater lattice constant than InAlGaP (see e.g. figs. 1-3). Therefore the structure of Honyak inherently possesses the claimed feature.

- e. As to claim 18, Honyak teaches quantum dots (see abstract).
- f. As to claim 19, applicant describes quantum wires as being markedly greater in one direction. However, applicant has given no measure of what constitutes markedly. Therefore, some of Honyak's dots will be inherently be longer than others making them quantum wires due to randomization and fluctuations in processing steps.

- g. As to claims 20-21 , Hoyonak teaches InAs quantum dots in AlGaAs or InGaP (see e.g. paragraph 32).
- h. As to claim 22, Hoyonak teaches a plurality of quantum wells which must be separated by a barrier to function as two wells (see e.g. claim 25).
- i. As to claim 23, Hoyonak teaches wherein the dot in every direction less than 50 nm (see e.g. paragraph 13).
- j. As to claim 24, Hoyonak teaches where the quantum well is 7 nm (see e.g. paragraph 42).
- k. As to claim 25. Hoyonak teaches a photodetector (see e.g. claim 23).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Faist (IEEE cited on IDS) in view Hoyonak.

- a. Faist teaches Quantum cascade laser. Faist does not teach the quantum well structure of claim 14.

Hoyonak teaches the structure of claim 14. Hoyonak further teach these dots can be used a source of carriers.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the quantum well structure of Hoyonak as a quantum cascade laser.

One would have been so motivated to optimize emission (see e.g. paragraph 6) and as a supply of carrier (see e.g. paragraph 11).

Response to Arguments

7. Applicant's arguments filed 1/6/2009 have been fully considered but they are not persuasive. As to the drawing objection Applicant argues that that since the only meaning of the quantum dots is to provide is to cancel or modulate translational symmetry of the barrier as a result the energy level are not relevant. This is not found convincing the totality of the prior art specifically that provide on Applicant IDs shows that quantum dots inherently provide energy level. To mix a physical structure (the quantum dots) with a band diagram is nonsensical. Either the band diagram of all the structures must be shown or the drawing must be removed. Whatever the intent of the quantum dots they inherently provide energy levels thus they must be shown in the band diagrams. In fact if on were to provide a band diagram the diagram would be equivalent to Holonyak.

8. As to the 112, 2nd rejections of claims 14 and 23 Applicant points the specification for support of lateral direction. However the specification never recites which of the three directions of the quantum well is to be considered the lateral. Thus the rejection is deemed proper and maintained.

9. As to the Holonyak reference Applicant argues the quantum dots of Holonyak are not part of the barrier. This is not found convincing figure 8 show region 825 is between 835 and 820 both of which are barriers. Similarly region 875 is also between 865 and 880, hence regions 875 and 825 maybe considered in the barriers. Moreover in paragraph 32 figure 4 of Holonyak, describes the quantum dots as being in the barrier this structure is similar to that of figures 9 and 13 of Holonyak. Therefore one may consider the quantum dots based on the interpretation of figure 4 applied to figure 9 and 13 to be in the barrier (see also paragraph 11). Further based on applicant's specification it is unclear what the difference between the two structures is. If one ignores the energy levels of the quantum dots of Holonyak just as Applicant has we have the same band diagram.

Thus the rejections are deemed proper and maintained.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Reames whose telephone number is (571) 272-2408. The examiner can normally be reached on M-Th 6:00 am-4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Davienne Monbleau can be reached on (571)272-1945. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MLR/

/Jack Chen/

Application/Control Number: 10/566,431

Page 9

Art Unit: 2893

Primary Examiner, Art Unit 2893